

House-GAN++: Generative Adversarial Layout Refinement Network towards Intelligent Computational Agent for Professional Architects

Year: 2021 | Citations: 133 | Authors: Nelson Nauata, Sepidehsadat Hosseini, Kai-Hung Chang, Hang Chu, Chin-Yi Cheng

Abstract

This paper proposes a generative adversarial layout refinement network for automated floorplan generation. Our architecture is an integration of a graph-constrained relational GAN and a conditional GAN, where a previously generated layout becomes the next input constraint, enabling iterative refinement. A surprising discovery of our research is that a simple non-iterative training process, dubbed component-wise GT-conditioning, is effective in learning such a generator. The iterative generator further allows us to improve a metric of choice via meta-optimization techniques by controlling when to pass which input constraints during iterative refinement. Our qualitative and quantitative evaluation based on the three standard metrics demonstrate that the proposed system makes significant improvements over the current state-of-the-art, even competitive against the ground-truth floorplans, designed by professional architects. Code, model, and data are available at <https://ennauata.github.io/houseganpp/page.html>.